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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,042	02/27/2004	Kie Y. Ahn	1303.050US2	8328

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EXAMINER

WILSON, ALLAN R

ART UNIT PAPER NUMBER

2815

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/789,042	AHN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Allan R. Wilson	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 20-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>0204, 1104</u>  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election of Species I, claims 1-19, is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Drawings***

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Double Patenting***

Claims 2 and 13 of this application conflict with claims 1 and 6 of Application No. 11/059,594. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all

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but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 5, 6, 12, 13, 16 and 17 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,365,470 to Maeda.

With regards to claims 1 and 12, Maeda illustrates in figures 1A-2C (entire document), particularly figure 2C, a substrate or body region 1; and a film 7 disposed on the substrate, the film containing LaAlO<sub>3</sub> (col. 3, lines 60-63).

With regards to claims 1-19, the examiner had to assume what the product would be by the process claimed. For example, in claim 1 it was assumed that the product was a film containing LaAlO<sub>3</sub>. The claim that it was “atomic layer deposited” was not considered to have full patentable weight. A “product by process” claim is directed to the product per se, no matter how actually made, MPEP 2113 “Product-by-Process Claims,” In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90; In re Marosi et al, 218 USPQ 289; and particularly In re Thorpe, 227

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USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

Regarding claims 2 and 13, Maeda discloses in col. 3, lines 60-63 and claim 12 the film includes  $\text{Al}_2\text{O}_3$  and  $\text{La}_2\text{O}_3$ .

Regarding claims 5, 6, 16 and 17, Maeda discloses in col. 3, lines 34-35, the film 7 has a thickness of 1 nm to 100nm (10 Å to 1000 Å).  $T_{\text{eq}} = (3.9/\text{K}) t$ . U.S. Patent No. 6,642,573 to Halliyal et al. (“Halliyal”) discloses in Table I that  $\text{LaAlO}_3$  has a value of 25. Therefore,  $T_{\text{eq}} = (3.9/25) 10 \text{ Å} = 1.56 \text{ Å}$  to operate the transistor at the lowest voltage.

Claims 1, 3, 12 and 14 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0032270 to Snyder et al. (“Snyder”).

With regards to claims 1 and 12, Snyder illustrates in figures 2-9 (entire document), particularly figure 2, a substrate or body region 210; and an amorphous film 250 disposed on the substrate, the film containing  $\text{LaAlO}_3$  (paragraph 28).

Claims 1, 4, 7-12, 15, 18 and 19 is rejected under 35 U.S.C. § 102(e) as being anticipated by Halliyal.

With regards to claims 1 and 12, Halliyal illustrates in figures 1-8 (entire document), particularly figure 1, a substrate or body region 16/18; and a film 26 disposed on the substrate, the film may contain a high-K dielectric  $\text{LaAlO}_3$  (col. 5, lines 17-27 and Table I). A high-K dielectric material is one having a K value of 20 or more (col. 6, lines 14-16).

Regarding claims 4 and 15, Halliyal discloses in Table I the film exhibits a dielectric constant of 25.

With regards to claim 7, Halliyal illustrates in figures 2-8 (entire document), particularly figure 2 a body region 18 between first and second source/drain regions 12/14 in a substrate 16; a film 42 on the body region between the first and second source/drain regions, the film containing  $\text{LaAlO}_3$  (Table I) and a gate 46 coupled to the film. The tunnel dielectric layer 42 can be a high-K dielectric material (col. 5, lines 39-41) and the ONO structure 26 can contain a high-K dielectric material (col. 5, lines 55-59).

Note: "the film being formed by atomic layer deposition including: pulsing a lanthanum containing precursor into a reaction chamber containing a substrate; pulsing a first oxygen containing precursor into the reaction chamber; pulsing an aluminum containing precursor into a reaction chamber; and pulsing a second oxygen containing precursor into the reaction chamber" is a product-by-process limitation (see above). Additionally, claims 8-10 are product-by-process claims.

Regarding claims 11, 18 and 19, Halliyal illustrates in Fig. 2 a floating gate 44 situated between the body region 18 and the gate 46; and a floating gate dielectric 26 disposed on the floating gate, separating the floating gate and the gate, the floating gate dielectric containing  $\text{LaAlO}_3$  (Table I).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Xi et al. illustrates a FET with a  $\text{LaAlO}_3$  film.

Any inquiry concerning this communication or earlier communications from an examiner should be directed to Primary Examiner Allan Wilson whose telephone number is (571) 272-1738. Examiner Wilson can normally be reached 7:00-4:00 Monday-Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'A. Wilson', with a long horizontal flourish extending to the right.

Allan R. Wilson  
Primary Examiner  
February 21, 2006